

NICASIO NATIVE GRASS RANCH

(MARIN CARBON FARM)—Nicasio, CA



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KEYLINE DESIGN & YEOMANS PLOW NATIVE GRASSES

Peggy Rathmann and John Wick

Becoming cattle ranchers was far from what John Wick and Peggy Rathmann imagined when they bought their 539-acre Marin County ranch in 1998. John and Peggy wanted a “piece of wilderness,” but discovered that grazing was essential to maintaining native grasses and wildflowers. Peggy realized that “the native flowers co-evolved with huge herds of elk, so native flowers need to be grazed.” John explains that “cows are the reason we now have native flowers on our ranch.” Ten years later, they seasonally graze 150 certified organic, certified grass-fed cows and steers using a “Tall Grazing” plan designed by Abe Collins from Carbon Farmers of America. Tall Grazing employs short-duration, ultra high-density stocking to mimic ancient elk herds. The short duration ensures that the cows only have time to “cream” off the nutritious tops of the grass plants. With plenty of leaf area left intact, photosynthesis can continue and the grazed plants recover rapidly. Not only that, but much of what the herd tramples becomes compost. The result is a rapid increase in soil organic matter.

Through their experiments in preserving native grass species, John and Peggy discovered Keyline design principles of soil conservation and water harvesting. They were happy to learn that they could recharge the groundwater and potentially see the dried-up creeks on their ranch start to flow year-round. John says that by using Tall Grazing practices along with remediation of compaction with a Yeomans plow, “it is possible to build a sponge of soil that absorbs rainwater rather than allowing it to rush away with our topsoil. Every year there are more and more delicious native grasses and forbs. The cows love it here and so does the wildlife.”



Yeomans plow

WHAT IS KEYLINE DESIGN?

- P.A. Yeomans developed the Keyline system to address decreasing water supplies and soil erosion on Australian rangeland.
- Keyline systems use natural landscape contours and cultivation techniques to harvest rainwater and build soil.
- The idea behind Keyline design is to reverse the pattern of water flowing away from ridges and concentrating in valleys. Redistributing the flow of water to the ridges using precise plow lines slightly off contour slows the spread of water and maximizes absorption into the soil.
- Keyline plans include hedgerows and swales – depressions that divert and capture water runoff for soil absorption.
- Yeomans designed a special chisel plow that loosens the sub-soil without inverting the soil. The rip patterns from the plow direct the movement of water across the land. Water slows and spreads to the ridges where the land is drier and the water can be more easily absorbed.

- Small ponds of surplus runoff water can be placed at the natural intersection of a ridge and a valley, known as a key point. This stored water can provide gravity-fed irrigation later in the season for pastureland or crops.

BENEFITS

- Keyline cultivation practices increase water infiltration by slowing and directing water to drier land (ridges) where it can be absorbed. Peggy explains, “Slowing and spreading running water prevents the formation of gullies that lower the water table and dry out soils. When running water moves at walking speed, soil particles settle out rather than wash away.”
- The sub-soil loosening plow helps to increase soil depth and fertility. According to John, “The Yeomans plow is a remedy for compaction – it breaks up the root barrier. The roots can now grow deeper because air, warmth, and moisture can go deeper. Perennial grasses love it.”
- With the Marin Carbon Project, they are working to verify the carbon sequestration benefits of managed grazing, compost application, and compaction remediation



Nicasio Native Grass Ranch (Marin Carbon Farm)
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with enhanced water infiltration using the Yeomans plow and Keyline planning.

- Keyline practices reduce soil erosion by slowing and directing the movement of runoff water to the ridges and away from the valleys.



Yeomans plow

COSTS

- Implementing a Keyline design plan requires an understanding of the concepts explained in P.A. Yeomans’s books, which are available online. (See Resources section.)
- The cost of a Yeomans plow starts at around \$8,000. However, Yeomans plows are becoming available for rent in some areas of California.

LESSONS LEARNED

- **Use the Yeomans plow as a remedy for compaction and as a rainwater-harvesting tool.** John explains, “Use it before three growing seasons and don’t graze plowed areas for 6 weeks. Once soils are thriving, the plow can move out into the community. In Marin, our RCD is considering buying plows as rental units.”
- **Attend a workshop.** Keyline workshops are periodically available through local permaculture organizations. (See Resources section for more information.)
- **Consult with an expert before using the plow.** Severe erosion can occur if you do not use the plow properly.